

WHAT IS CLAIMED IS:

- 1           1.       A device for collecting viable gas-borne matter comprising:  
2                   an inlet;  
3                   an outlet;  
4                   a plate provided intermediate the inlet and the outlet and having a first  
5 surface facing the inlet and a second surface facing the outlet; and  
6                   a substance provided on the first surface of the plate for capturing  
7 viable matter carried in a gas drawn through the inlet;  
8                   wherein the substance is configured to maintain the viable matter in a  
9 living state without promoting growth of the viable matter.
- 1           2.       The device of claim 1, wherein the substance is at least one of a gel  
2 and a semi-solid material.
- 1           3.       The device of claim 1, wherein the substance is relatively colorless.
- 1           4.       The device of claim 1, wherein the substance comprises a hydrocolloid  
2 and at least one nutrient.
- 1           5.       The device of claim 4, wherein the hydrocolloid is selected from the  
2 group consisting of algal type hydrocolloid materials, botanical type hydrocolloid  
3 materials, microbial type hydrocolloid materials, animal type hydrocolloid materials,  
4 and combinations thereof.
- 1           6.       The device of claim 5, wherein the algal type hydrocolloid materials  
2 comprise at least one of agar, carrageenan, and alginate.
- 1           7.       The device of claim 5, wherein the botanical type hydrocolloid  
2 materials comprise at least one of arabic, karaya, guar, locust tara, tamarind, daraya,  
3 ghatti, tragacanth, cellulose, starch, pectin, knonjac, glactomannans, xyloglucan, and  
4 combinations thereof.

1           8.       The device of claim 5, wherein the microbial type hydrocolloid  
2 materials comprise at least one of curdlan, xanthan, dextran, gellan, B-glucans,  
3 chitosan, alginates, inulin, CRC biopolymer, and combinations thereof.

1           9.       The device of claim 5, wherein the microbial type animal type  
2 hydrocolloid materials comprise at least one of gelatin, caseinate, whey, and chitosan.

1           10.      The device of claim 4, wherein the nutrient is one of a sugar, a cell  
2 culture serum, an amino acid, a blood lipid, and a protein.

1           11.      The device of claim 10, wherein the nutrient is selected from the group  
2 consisting of glucose, sucrose, bovine serum, glutamic acid, albumin, hemoglobin,  
3 charcoal, sodium glycerophosphate, mercaptoacetic acid, sodium chloride, potassium  
4 citrate, potassium chloride, calcium chloride, magnesium chloride, monopotassium  
5 phosphate, disodium phosphate, sodium thioglycollate, L-cysteine hydrochloric,  
6 peptone, sodium phosphate, potassium phosphate, and combinations thereof.

1           12.      The device of claim 10, wherein the nutrient also acts as a pH buffer.

1           13.      The device of claim 4, wherein the substance further comprises at least  
2 one of a humectant, water, and an anti-bacterial agent.

1           14.      The device of claim 13, wherein the humectant is selected from the  
2 group consisting of mineral oil, plant oil, peanut oil, soybean oil, vegetable oil, corn  
3 oil, molasses, honey, corn syrup, fruitrim, invertase, invert sugar, glycerin, polyols,  
4 Triacetin, an hydrogenated glucose syrup, a polydextrose nutrient, and combinations  
5 thereof.

1           15.      The device of claim 13, wherein the anti-bacterial agent is selected  
2 from propylene glycol, chloramphenicol, vancomycin, and combinations thereof.

1           16.      The device of claim 13, wherein the substance further comprises an  
2 antifungal.

1           17.     The device of claim 1, wherein the substance may be stored without  
2 refrigeration between approximately 12 to 24 months.

1           18.     The device of claim 1, wherein the substance is configured to allow  
2 removal of the viable matter from the substance in a liquid.

1           19.     The device of claim 18, wherein the liquid is water.

1           20.     The device of claim 1, wherein the viable matter comprises at least one  
2 of mold spores, insects, insect parts, and skin cells.

1           21.     The device of claim 1, wherein the viable matter comprises a virus.

1           22.     The device of claim 1, wherein the viable matter comprises bacteria.

1           23.     The device of claim 1, wherein the inlet is configured for coupling to a  
2 device configured to remove matter from the gas before the gas enters the inlet.

1           24.     The device of claim 1, wherein the device is configured for coupling to  
2 an exterior surface of a sampling device.

1           25.     The device of claim 1, wherein the device comprises a top portion  
2 including the inlet and a bottom portion including the outlet, wherein the device is  
3 adapted to allow decoupling of the top portion and the bottom portion to remove the  
4 plate.

1           26.     The device of claim 1, wherein the device is a single-use product that  
2 is discarded after capturing viable matter.

1           27.     The device of claim 1, wherein the device includes a second inlet,  
2 wherein the inlets are provided at different locations in relation to the suspension  
3 medium.

1           28.     The device of claim 1, wherein the plate is made of at least one of  
2     glass, porous glass fibers, a ceramic material, a porous polymeric material, and a  
3     metal.

1           29.     A collection device for use in sampling gas that contains viable matter  
2     comprising:  
3                     a suspension medium for preserving viable matter in a living state; and  
4                     means for directing a flow of gas toward the suspension medium;  
5                     wherein the suspension medium is configured for capturing viable  
6     matter included in the gas as the gas is drawn through the means for directing a flow  
7     of gas.

1           30.     The collection device of claim 29, wherein the means for directing a  
2     flow of gas comprises an inlet.

1           31.     The collection device of claim 30, wherein the inlet tapers from a top  
2     of the inlet to a bottom of the inlet.

1           32.     The collection device of claim 31, wherein the bottom of the inlet has a  
2     rectangular shape when viewed in the axial direction.

1           33.     The collection device of claim 29, wherein the suspension medium has  
2     is a gel or a semisolid material.

1           34.     The collection device of claim 29, wherein the suspension medium is  
2     configured to preserve the viable matter without promoting further maturation of the  
3     viable matter.

1           35.     The collection device of claim 29, wherein the suspension medium  
2     includes a humectant, an anti-bacterial agent, and a hydrocolloid.

1           36.     The collection device of claim 29, wherein the suspension medium  
2     comprises water and at least one of mineral oil, starch, glycerin, galatin, and  
3     carageenan.

1           37.     The collection device of claim 29, wherein the suspension medium  
2     comprises water and at least one of gellan, glycerin, calcium chloride, a polyol,  
3     honey, corn syrup, and pectin.

1           38.     The collection device of claim 29, wherein the viable matter comprises  
2     at least one of a bacterium and a virus.

1           39.     The collection device of claim 29, wherein the viable matter comprises  
2     at least one of a mold spore, anthrax, an insect, an insect part.

1           40.     The collection device of claim 29, wherein the collection device is a  
2     cassette having a top portion and a bottom portion and a plate provided within the  
3     cassette, wherein the top portion and bottom portion may be separated to remove the  
4     plate.

1           41.     A plate for use in a gas-borne matter collection device comprising:  
2                   a substance provided on a surface of the plate for preserving viable  
3     matter in a living state without generally promoting growth of the viable matter.

1           42.     The plate of claim 41, wherein the substance has is relatively is a gel or  
2     a semisolid material.

1           43.     The plate of claim 41, wherein the substance includes a humectant, an  
2     anti-bacterial agent, and a hydrocolloid.

1           44.     The plate of claim 41, wherein the substance includes a hydrocolloid  
2     material and at least one nutrient.

1           45.     The plate of claim 41, wherein the substance comprises water and at  
2     least one of mineral oil, starch, glycerin, galatin, and carageenan.

1           46.     The plate of claim 41, wherein the substance comprises water and at  
2     least one of gellan, glycerin, calcium chloride, a polyol, honey, corn syrup, and pectin.

1           47.     The plate of claim 41, wherein the substance comprises a hydrocolloid  
2     and at least one nutrient.

1           48.     The plate of claim 47, wherein the hydrocolloid is selected from the  
2     group consisting of algal type hydrocolloid materials, botanical type hydrocolloid  
3     materials, microbial type hydrocolloid materials, animal type hydrocolloid materials,  
4     and combinations thereof.

1           49.     The plate of claim 47, wherein the nutrient is one of a sugar, a cell  
2     culture serum, an amino acid, a blood lipid, and a protein.

1           50.     The plate of claim 49, wherein the nutrient is selected from the group  
2     consisting of glucose, sucrose, bovine serum, glutamic acid, albumin, hemoglobin,  
3     charcoal, sodium glycerophosphate, mercaptoacetic acid, sodium chloride, potassium  
4     citrate, potassium chloride, calcium chloride, magnesium chloride, monopotassium  
5     phosphate, disodium phosphate, sodium thioglycollate, L-cysteine hydrochloric,  
6     peptone, sodium phosphate, potassium phosphate, and combinations thereof.

1           51.     The plate of claim 47, wherein the nutrient also acts as a pH buffer.

1           52.     The plate of claim 47, wherein the substance further comprises at least  
2     one of a humectant, water, and an anti-bacterial agent.

1           53.     The plate of claim 52, wherein the humectant is selected from the  
2     group consisting of mineral oil, plant oil, peanut oil, soybean oil, vegetable oil, corn  
3     oil, molasses, honey, corn syrup, fruitrim, invertase, invert sugar, glycerin, polyols,  
4     Triacetin, an hydrogenated glucose syrup, a polydextrose nutrient, and combinations  
5     thereof.

1           54.     The plate of claim 41, wherein the substance is configured to preserve  
2     viable matter without promoting further maturation of the viable matter.

1           55.     The plate of claim 47, wherein the viable matter comprises at least one  
2     of a bacterium and a virus.

1           56.     The plate of claim 47, wherein the viable matter comprises at least one  
2     of a mold spore, anthrax, an insect, an insect part.

1           57.     A method of collecting viable matter included in a gaseous  
2     atmosphere, the method comprising:  
3                 directing a flow of gas toward a suspension medium, the suspension  
4     material configured to maintain viable matter in a living state;  
5                 capturing viable matter carried in the gas in the suspension material;  
6     and  
7                 removing the viable matter from the suspension material.

1           58.     The method of claim 57, wherein the step of removing the viable  
2     matter from the suspension material comprises adding at least a portion of the  
3     suspension material to a liquid.

1           59.     The method of claim 58, wherein the liquid is water.

1           60.     The method of claim 57, wherein removing the viable matter from the  
2     suspension material comprises shaking the suspension material.

1           61.     The method of claim 57, further comprising providing nutrients to the  
2     viable matter after the step of removing the viable matter from the suspension  
3     material.

1           62.     The method of claim 60, wherein the step of providing nutrients to the  
2     viable matter comprises placing the viable matter in an agar medium.

1           63.     The method of claim 62, wherein the suspension material includes a  
2     humectant, an anti-bacterial agent, and a hydrocolloid material.

1           64.     The method of claim 57, wherein the suspension material does not  
2     include an amount of nutrients sufficient to allow development of the viable matter.

1           65.     The method of claim 57, wherein the viable matter comprises at least  
2     one of mold, fungus, and bacterium.